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AUTHOR Hymel, Glenn M.; Dyck, Walter E.
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ABSTRACT

Twenty-five years have elapsed since the publication of Benjamin S. Bloom's article titled "Learning for Mastery." With approximately 2,000 master learning/testing citations in the ERIC data base alone, Bloom's 1968 piece is indeed one of the most generative works to appear in the educational psychology literature in decades. At this quarter-century juncture, then, it is appropriate to reflect retrospectively and prospectively on the meaning, impact, and continuing possibilities of Bloom's learning for mastery. In so doing, this paper focuses on what could be termed the "internationalization" of mastery learning. Evidence of mastery learning research and development initiatives in well over 30 nations does indeed invite not only an analysis of what has already transpired in the worldwide community but also a projection of future directions for mastery learning in the international arena. (Contains 119 references.) (Author)

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The Internationalization of Bloom's Learning for Mastery: A 25-Year Retrospective-Prospective View

Glenn M. Hymel
Loyola University
New Orleans, Louisiana
United States

Walter E. Dyck
University of Antwerp
University of Brussels
Belgium

Paper presented at the annual meeting of the American Educational Research Association, Atlanta, 15 April 1993.

Reactions to this paper are encouraged and may be directed to Dr. Glenn M. Hymel, Chairman & Associate Professor, Department of Psychology, Loyola University, New Orleans, LA 70118, USA; Telephone: 504-865-3257; Fax: 504-865-2149; Bitnet: HYMEL@LOYNOVM; Internet: AVPSGHY@MUSIC.LOYNO.EDU

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Abstract

Twenty-five years have elapsed since the publication of Benjamin S. Bloom's article titled "Learning for Mastery." With approximately 2,000 mastery learning/testing citations in the ERIC data base alone, Bloom's 1968 piece is indeed one of the most generative works to appear in the educational psychology literature in decades. At this quarter-century juncture, then, it is appropriate to reflect retrospectively and prospectively on the meaning, impact, and continuing possibilities of Bloom's learning for mastery. In so doing, this paper focuses on what could be termed the internationalization of mastery learning. Evidence of mastery learning research and development initiatives in well over 30 nations does indeed invite not only an analysis of what has already transpired in the worldwide community but also a projection of future directions for mastery learning in the international arena.

The Internationalization of Bloom's Learning for Mastery: A 25-Year Retrospective-Prospective View

Benjamin S. Bloom's 1968 article titled "Learning for Mastery" has become one of the most generative works to appear in the educational psychology literature in decades. A recent computer search of the ERIC data base revealed 1,297 citations associated with the search expression "learning for mastery" and 683 citations based on the term "mastery testing," for a total of 1,983 documents. And, of course, there are those entries in the mastery learning literature predicated on Bloom's seminal work that are simply not included in the ERIC system. Furthermore, the Social Science Citation Index indicates 1,504 instances of Bloom's specific 1968 article being cited in the professional literature.

Owing its conceptual origins partly to the earlier works of Washburne (1922), Morrison (1926), and Carroll (1963), Bloom's LFM examines the relationship between the concepts of time as a variable and high student performance as a constant. This is done in the context of the following two principal orientations that are now standard knowledge among mastery learning researchers and practitioners (Anderson, 1981; Anderson & Block, 1975; Block, 1971, 1980, 1985; Bloom, 1968, 1971, 1976, 1980): First, in the theoretical realm there is the optimistic set of assumptions regarding the capability of students to learn if alterable variables comprising the conditions of learning are optimized. Secondly, in the more practical realm there is the array of adaptive instructional procedures predicated on the medical model of diagnostic-prescriptive intervention.

From both theoretical and practical perspectives, then, Bloom's learning for mastery has served as a catalyst for a paradigm shift from a dominant prediction-selection model to an emerging diagnostic-development model (Dyck, 1976; Dyck & Wellens, 1979; Dyck & Wouters, 1989; Dyck, Van de Looverbosch, & Wouters, 1982). Accordingly, success or failure in school learning is viewed largely as an artifact of the extent to which we appropriately accommodate certain learner-based and instruction-oriented variables considered to be alterable rather than static.

Over the past 25 years since the appearance of Bloom's article, most of the mastery learning literature has focused on the North American experience and its socio-psycho-cultural interpretations with only occasional documentation of mastery learning efforts in Western Europe, Asia, the Middle East, South America, and Australia (Anderson & Block, 1985; Hymel, 1990, 1991; Thomas, 1985). This pattern had been suggested earlier--and later corroborated--by entries in a comprehensive bibliography on mastery learning (Hymel, 1982), state-of-the-art literature reviews on mastery learning (Block & Burns, 1976; Guskey & Gates,

1986; Guskey & Pigott, 1988; Kulik, Kulik, & Bangert-Drowns, 1990; Kulik, Kulik, & Cohen, 1979), and attempts to identify major gaps in the literature that suggest future directions for mastery learning efforts (Hymel, 1990, 1991).

In response to this paucity of a worldwide perspective on mastery learning in the professional literature, a paper (Hymel & Dyck, 1992) delivered last year at the 25th International Congress of Psychology in Brussels attempted to initiate an international focus on mastery learning. Included among the several objectives of that paper was the acknowledgment of mastery learning efforts in approximately 30 nations beyond North America.

Clearly, then, Bloom's original thoughts on mastery learning in 1968 have taken on an international character that has ramifications both retrospectively and prospectively. In a retrospective sense, there is still a pressing need for integrative literature reviews beyond the Hymel and Dyck (1992) paper that document the nature of past and current mastery learning initiatives in the international community at large. And in a prospective sense, the internationalization of mastery learning abounds with possibilities for further explorations that may not only reflect and reaffirm many of mastery learning's basic tenets but also challenge and modify some of these views as cross-cultural variables are examined.

A Retrospective View

The internationalization of mastery learning viewed retrospectively can be considered in terms of geographic locations, topical areas, and information sources.

Geographic Locations & Topical Areas

Data bases such as ERIC's Resources in Education and Current Index to Journals in Education as well as Psychological Abstracts identify approximately 110 entries that are associated with authors, institutional affiliations, and/or research settings geographically positioned beyond the United States and Canada. Admittedly, this is only a rough index and undoubtedly there are mastery learning contributions occurring internationally that are not captured by these data bases. These three preliminary sources, though, do obviously indicate certain geographic locations and topical areas that suggest a classification scheme for considering mastery learning initiatives in the international community.

The following, then, are mastery learning citations specific to certain geographic locations and are intended as representative rather than exhaustive: Australia (Chan & Cole, 1986; Gay, 1984;

Hermann, 1986; McBeath, 1986; Stanford & Imrie, 1981; Ward, 1979); Belgium (Dyck & Wouters, 1989; Dyck, Van de Looverbosch, & Wouters, 1982); Brazil (Keller & Sherman, 1974; Sherman, 1974); Chile (Pizarro Sanchez, 1992); China (Zhongliang, Xuyang, & Xiaoping, 1984); Cuba (Martuza, 1986); Egypt (Wahby, 1979); England (Pennycuik & Murphy, 1986; Straker, 1988); Finland (Lahdes, 1983); France (Council of Europe, 1975); Germany (Langeheine, 1992; Sandrin, 1990); India (Chaudhari & Vaidye, 1986); Ireland (Whiting, 1982, 1984); Israel (Katz, 1986; Kremer-Hayon & Ben-Peretz, 1984; Lewy & Nevo, n.d.; Mevarech, 1986, 1991; Mevarech & Werner, 1985; Reves & Levine, 1990; Tenenbaum, 1986); Japan (Cummings, 1977); Korea (Kim, 1971, 1975; Lee, 1977); Lebanon (Reed, 1983); Malaysia (Nordin, 1980); Mexico (Maginnitu, 1976); Netherlands (Creemers, 1976; de Gruijtes, 1985; Reezigt & Weide, 1990; Van der Linden, 1987; Vos, 1988; Warries, 1974); New Zealand (Imrie, 1984; Studman, 1984); Nigeria (Badmus, 1976); Norway (Skaalvik, 1975); Puerto Rico (Canino & Cicchelli, 1988); Scotland (Drever, 1987; Parkinson, Mitchell, & Johnstone, 1983; Peacock, 1981); Sweden (Dahllof, 1978; Fischbein, 1979); Switzerland (Flammer, 1973); Taiwan (Chen, 1987). Evidence is also available for mastery learning's appearance in Singapore (E. Thomas, personal communication, April, 1992).

The topical areas addressed via mastery learning in the above-mentioned countries are quite varied and include the following: agriculture, comparative education, compensatory education, curriculum planning, computer sciences, economics, foreign languages, growth and development, health science, language arts, library science, mathematics, microbiology, physics, psychometrics, science (general), teacher education, and vocational education/training.

International Sources of Information on Mastery Learning

The role of North American-rooted data bases such as the ERIC system and Psychological Abstracts has already been mentioned as foundational to locating mastery learning documentation. These are augmented on the international scene by (a) the British Education Index, (b) the Bulletin signaletique des Sciences de l'Education in France, and (c) EUDISED that spans 16 countries in Western Europe. These repositories do not, however, suffice as the sole sources of information on mastery learning programs and personnel internationally. Another option that exists and has been used fruitfully is that of the so-called foreign affiliate membership rosters of national professional organizations (e.g., AERA and APA). Furthermore, membership lists from international organizations (e.g., the International Council of Psychologists and the International Association of Applied Psychology) are useful in tandem with those of national organizations as a basis

for periodic mailed surveys inviting input on mastery learning efforts that for whatever reason are not included in the standard data bases.

A Prospective View

A prospective view of mastery learning in an international context can be approached from the following vantage points: (a) expanding beyond what has already transpired with respect to geographic locations and topical areas impacted; (b) establishing communication networks; and (c) expanding the scope of mastery learning to incorporate cross-cultural considerations.

Expanding Geographic Locations & Topical Areas of Impact

The geographic "migration" of mastery learning beyond its origins in the United States to encompass approximately 30 additional countries over the past 25 years can be expected to continue. The same expansion can be anticipated as well regarding those topical areas to which mastery learning is applied in the international community. A major impetus for this prognosis is the increased attention being given to cross-cultural themes addressed from a multidisciplinary standpoint as well as the reality of professional organizations becoming more internationally sensitive. Subsequent sections of this paper shall address both of these points in greater detail.

Establishing Communication Networks

Another anticipated development related to the continued internationalization of mastery learning is that of communication networks being established that would focus on material and personnel resources and would enhance their accessibility worldwide through professional societies, forums/conferences, and data bases/repositories. An initial effort in this regard is the current attempt to establish an International Society for Mastery Learning (see Hymel & Dyck, 1992, in preparation) that would sponsor forums both in printed forms (e.g., quarterly newsletter and/or journal) and as biennial conferences (e.g., in affiliation with existing national and/or international organizations such as AERA, APA, and the International Council of Psychologists). This proposed professional society would likewise function as an international data base or repository for identifying, housing, consolidating, and monitoring mastery learning efforts worldwide.

Incorporating Cross-Cultural Themes

A third projected focus for mastery learning as its internationalization continues is that of researchers and practitioners giving greater attention to cross-cultural issues that bear upon instruction and learning.

It perhaps borders on stating the obvious to suggest that the relevance and/or validity of mastery learning's theoretical assumptions and instructional practices may indeed vary somewhat when examined from the vantage point of diverse cultures. Nonetheless, a belief system and corresponding instructional strategy that challenge--unsuccessfully at times even on its own turf--the prevailing prediction-selection paradigm of learning and instruction by offering an alternate diagnostic-development model, must surely be scrutinized in terms of possible consistencies and inconsistencies with the cultural milieu of any society in which it might be proposed.

This necessity for considering cross-cultural issues where the viability of both the theory and practice of mastery learning is concerned naturally lends itself to the literature available on international education (e.g.: Debeauvais, 1985b; Heater, 1985; Holmes, 1985; Husen, 1985; King, 1985; Ottobre, 1985; Perkins, 1985; Postlethwaite, 1985; Stone, 1985; Sutton, 1985). Equally pertinent--and in some instances perhaps even more critical than the international education literature--are those sources on comparative education (e.g.: Anderson, 1985; Brickman, 1985; Coombs, 1985; Debeauvais, 1985a; Eckstein, 1985; Foster, 1985; Holmes, 1985a, 1985b; Ignas & Corsini, 1981; Irvine & Berry, 1988; Kallen, 1985; Noah, 1985; Porras-Zuniga, 1985; Rosier, 1985; Shade, 1989). Also, in view of mastery learning's most basic affiliation with the discipline of psychology, the expanding literature on international psychology indeed has a strategic role to play (e.g.: Ardila, 1982; Hall, 1990; McPherson, 1986; Moghaddam, 1987; Russell, 1984; Sexton & Misiak, 1984; Smith, 1983). And perhaps even more to the point, cross-cultural psychology sources are critical to considerations of the diversity of human behavior and the cultural context in which it occurs (e.g.: Berry, Poortinga, Segall, & Dasen, 1992; Brislin, 1990; Laboratory of Comparative Human Cognition, 1986; Rogoff & Morelli, 1989; Shweder & Sullivan, 1993; Tharp, 1989).

References

Anderson, C. A. (1985). Comparative education center, University of Chicago. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 854-855). New York: Pergamon Press.

Anderson, L. W. (1981). A functional analysis of mastery learning. Outcomes, 1(2), 1-3.

Anderson, L. W., & Block, J. H. (1985). Mastery learning model of teaching and learning. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 6) (pp. 3219-3230). New York: Pergamon Press.

Ardila, R. (1982). International psychology. American Psychologist, 37, 323-329.

Badmus, G. A. (1976). Bloom's model of mastery learning as an instructional strategy in mathematical education of UPE teachers. West African Journal of Teacher Education, 20(2), 231-243.

Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). Cross-cultural psychology: Research and applications. New York: Cambridge University Press.

Block, J. H. (Ed.). (1971). Mastery learning: Theory and practice. New York: Holt, Rinehart, & Winston.

Block, J. H. (1980). Promoting excellence through mastery learning. Theory Into Practice, 19, 66-74.

Block, J. H. (1985). Belief systems and mastery learning. Outcomes, 4(2), 1, 4-14.

Block, J.H., & Burns, R. B. (1976). Mastery learning. In L. S.Shulman (Ed.), Review of research in education (4th ed.) (pp. 3-49). Itasca, IL: F. E. Peacock, Inc.

Bloom, B. S. (1968). Learning for mastery. Evaluation Comment, 1(2). [Unpaginated]

Bloom, B. S. (1971). Individual differences in school achievement: A vanishing point? (A Phi Delta Kappa Monograph). Bloomington, IN: Phi Delta Kappa International.

Bloom, B. S. (1976). Human characteristics and school learning. New York: McGraw-Hill.

Bloom, B. S. (1978). New views of the learner: Implications for instruction and curriculum. Educational Leadership, 35, 563-568, 570-576.

Bloom, B. S. (1980). The new direction in educational research: Alterable variables. Phi Delta Kappan, 61,(6), 382-385.

Brickman, W. W. (1985). Comparative and international education. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 851-853). New York: Pergamon Press.

Brislin, R. W. (Ed.). (1990). Applied cross-cultural psychology (Vol 14 of the Cross-Cultural Research & Methodology Series). Newbury Park, CA: Sage Publications.

Canino, C., & Cicchelli, T. (1988). Cognitive styles, computerized treatments on mathematics achievement and reaction to treatments. Journal of Educational Computing Research, 4(3), 253-264.

Carroll, J. B. (1963). A model of school learning. Teachers College Record, 64, 723-733.

Chan, K. S., & Cole, P. G. (1986, April). An aptitude-treatment interaction in a mastery learning model of instruction. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA. (ERIC Document Reproduction Service No. ED 271 719)

Chaudhari, U. S., & Vaidya, S. (1986). Effectiveness of concept attainment (CA) and mastery learning (ML) models in language learning. Psycho-Lingua, 16(2), 119-127.

Chen, L. H. (1987). A study of mastery learning and its effects on mathematics education in elementary school. Unpublished master's thesis, National Taiwan Normal University, Taiwan, Republic of China.

Combs, F. S. (1985). Comparative studies of educational policy. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education (Vol. 2) (pp. 884-887). New York: Pergamon Pres

Council of Europe. (1974). Compensatory education workshop documents (Strasbourg, October 7-11, 1974). Strasbourg, France: Author, Documentation Center for Education in Europe. (ERIC Document Reproduction Service No. ED 121 419)

Creemers, B. P. M. (1976, October). The project: Education and social environment, Rotterdam (The Netherlands) Paper presented at the annual meeting of the International Management Training for Educational Change, Los Angeles. (ERIC Document Service Reproduction No. ED 215 041)

Cummings, W. K. (1977). The secret of Japanese education: The role of education in socioeconomic achievement--a comparative study (Final Report). Washington, DC: National Institute of Education, DHEW. (ERIC Document Reproduction Service No. ED 147 202)

Dahllof, U. (1978). Curriculum evaluation, frame factors and teaching for mastery (Uppsala Reports on Education 2). Sweden: Uppsala University, Institute of Education. (ERIC Document Reproduction Service No. ED 167 492)

Debeauvais, M. (1985a). Documentation in comparative education. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 859-865). New York: Pergamon Press.

Debeauvais, M. (1985b). International institute for educational planning (IIEP). In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2669-2671). New York: Pergamon Press.

de Gruijter, D. N. (1985). Compromise models for establishing examination standards. Journal of Educational Measurement, 22(4), 263-269.

Drever, A. (1987). Mastery learning in the secondary school: A report of school based research (Stirling Educational Monograph No. 17). Stirling, Scotland: University of Stirling, Department of Education.

Dyck, W. E. (1976). Geschiktheid en selectie in het universitair onderwijs. [Aptitude and selection for university]. Doctoral dissertation, University of Antwerp, Antwerp, Belgium.

Dyck, W. E., & Wellens, J. (1979). Een opkomend instructieparadigma: Beheersingsleren. [An emerging instructional paradigm: Mastery learning]. Persoon en Gemeenschap, 31, 180-190.

Dyck, W. E., & Wouters, P. (1989). A peculiar evaluation of Belgian teacher education programs. Outcomes, 8(2), 50-54.

Dyck, W. E., Van de Looverbosch, M., & Wouters, P. (1982, March). Improving the effectiveness of undergraduate education: An experience from a Belgian university. Paper presented at the annual meeting of the American Educational Research Association, New York. (ERIC Document Reproduction Service No. ED 219 011)

Eckstein, M. A. (1985). Comparative education: Concepts and theories. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education (Vol. 2) (pp. 855-858). New York: Pergamon Press.

Fishbein, S. (1979). Heredity-environment influences on growth and development during adolescence: A longitudinal study of twins (Studies in Education and Psychology 4). Stockholm, Sweden: Stockholm School of Education, Department of Educational Research. (ERIC Document Reproduction Service No. ED 183 615)

Flammer, A. (1973). Individuelle differenzen im lernen nach der mastery learning strategie. Zeitschrift fur Experimentelle und Angewandte Psychologie, 20(4), 529-546.

Foster, P. (1985). Comparative education: Area studies. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 853-854. New York: Pergamon Press

Gay, J. E. (1984). An analysis of aptitude as a predictor of achievement in an individualized mode of health instruction. British Journal of Educational Technology, 2(15), 150-155.

Guskey, T. R., & Gates, S. L. (1986). Synthesis of research on the effects of mastery learning in elementary and secondary classrooms. Educational Leadership, 43, 73-80.

Guskey, T. R., & Pigott, T. D. (1988). Research on group-based mastery learning programs: A meta-analysis. The Journal of Educational Research, 81(4), 197-216.

Hall, J. P. (1990). Lessons from the First European congress of psychology. American Psychologist, 45, 978-980.

Heater, D. (1985). International education: Educational programmes. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2666-2667). New York: Pergamon Press.

Holmes, B. (1985a). Comparative education: International nongovernmental associations. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 867-869). New York: Pergamon Press.

Holmes, B. (1985b). History of comparative education. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 865-867). New York: Pergamon Press.

Holmes, B. (1985c). International bureau of education (IBE). In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2648-2649). New York: Pergamon Press.

Husen, T. (1985). International education. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp.2660-2666). New York: Pergamon Press.

Hymel, G. M. (1982). Mastery learning: A comprehensive bibliography (2nd ed.). New Orleans: Clearinghouse on Mastery Learning, Loyola University.

Hymel, G. M. (1990, April). Harnessing the mastery learning literature: Past efforts, current status, and future directions. Paper presented at the annual meeting of the American Educational Research Association, Boston.

Hymel, G. M. (1991). AERA's SIG/mastery learning since its inception (1981-1991): A 10-year retrospective-prospective view. Outcomes, 10(3), 24-33.

Hymel, G. M., & Dyck, W. E. (1992, July). An international perspective on mastery learning. Paper presented at the 25th International Congress of Psychology, Brussels, Belgium.

Hymel, G. M., & Dyck, W. E. (in preparation). Mastery learning in the European research community. Paper accepted for presentation at the 3rd European Congress of Psychology, Tampere, Finland, July 1993.

Ignas, E., & Corsini, R. J. (Eds.). (1981). Comparative educational systems. Itasca, IL: F. E. Peacock Publishers, Inc.

Imrie, B. W. (1984, July). In search of academic excellence: Samples of experience. Paper presented at the International Conference on Improving University Teaching, College Park, MD. (ERIC Document Reproduction Service No. ED 294 467)

Irvine, S. H., & Berry, J. W. (Eds.). (1988). Human abilities in cultural context. Cambridge: Cambridge University Press.

Kallen, D. (1985). Comparative education society in Europe. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 872-874). New York: Pergamon Press.

Katz, N. (1986). Time needed to learn as a function of individual learning style and teaching method. Studies in Educational Evaluation, 12, 237-239.

Keller, F. S., & Sherman, J. G. (1974). PSI: The Keller plan handbook. Menlo Park, CA: W. A. Benjamin, Inc.

Kim, H. (1971). Mastery learning in the Korean middle schools. UNESCO Regional Office for Education in Asia, 6(1), Sec. 1, 55-60.

Kim, H. (1975). Experimentation in education. mastery learning in Korea. Paris: International Institute for Educational Planning. (ERIC Document Reproduction Service No. ED 132 155)

King, K. (1985). International development research center (IDRC). In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2659-2660). New York: Pergamon Press.

Kremer-Hayon, L., & Ben-Peretz, M. (1984, April). A strategy of professional development for dealing with individual differences in the classroom: An Israeli case. Paper presented at the annual meeting of the American Educational Research Association, New Orleans. (ERIC Document Reproduction Service No. ED 246 041)

Kulik, C. C., Kulik, J. A., & Bangert-Drowns, R. L. (1990). Effectiveness of mastery learning programs: A meta-analysis. Review of Educational Research, 60(2), 265-299.

Kulik, J. A., Kulik, C. C., & Cohen, P. A. (1979). A meta-analysis of outcome studies of Keller's personalized system of instruction. American Psychologist, 34, 307-318.

Laboratory of Comparative Human Cognition. (1986). Contributions of cross-cultural research to educational practice. American Psychologist, 41, 1049-1058.

Lahdes, E. (1983). Mastery learning in theory and in practical innovation. Scandinavian Journal of Educational Research, 27(2), 89-107.

Langeheine, R. (1982, April). State mastery learning: Dynamic models for longitudinal data. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Lee, Y. D. (1977). KEDI (Korean Educational Development Institute) instructional strategies. Paris: United Nations Educational, Scientific, and Cultural Organization; International Institute for Educational Planning. (ERIC Document Reproduction Service No. ED 180 061)

Lewy, A., & Nevo, D. (Eds.). (n.d.). Evaluation roles in education. New York: Gordon & Breach.

Maginnity, G. F. (1976). A personalized system of instruction in library use. Monterrey, Mexico: Instituto Technologico de Monterrey. (ERIC Document Reproduction Service No. ED 125 530)

Martuza,V. R. (1986). Evaluation of reading achievement in Cuban schools: A comparative perspective. The Reading Teacher, December, 306-313.

McBeath, C. (1986). Curriculum decision making in TAFE (Technical & Further Education). Payneham, Australia: TAFE National Centre for Research and Development. (ERIC Document Reproduction Service No.ED 275 842)

McPherson, F. M. (1986). The professional psychologist in Europe. American Psychologist, 41, 302-305.

Mevarech, Z. R. (1986). The role of a feedback-corrective procedure in developing mathematics achievement and self concept in desegregated classrooms. Studies in Educational Evaluation, 12, 197-203.

Mevarech, Z. R. (1991). Learning mathematics in different mastery environments. Journal of Educational Research, 84(4), 225-231.

Mevarech, Z. R., & Werner, S. (1985). Are mastery learning strategies beneficial for developing problem solving skills? Higher Education, 14, 425-432.

Moghaddam, F. M. (1987). Psychology in three worlds. American Psychologist, 42, 912-920.

Morrison, H. C. (1926). The practice of teaching in the secondary schools. Chicago: University of Chicago Press.

Noah, H. J. (1985). Comparative education: Methods. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 869-872). New York: Pergamon Press.

Nordin, A. B. (1980). Improving learning: An experiment in rural primary schools in Malaysia. Evaluation in Education: An International Review Series, 4(2), 143-263.

Ottobre, F. M. (1985). International association for educational assessment (IAEA). In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (p. 2644). New York: Pergamon Press.

Parkinson, B. L., Mitchell, R. F., & Johnstone, R. M. (1983). Mastery learning in modern languages--a case study. PLET, 20(1), 43-53.

Peacock, C. (1981, July). Reading and writing at foundation level: A mastery learning approach. Paper presented at the annual meeting of the United Kingdom Reading Association, Edinburgh, Scotland. (ERIC Document Reproduction Service Number ED 208 400)

Pennycuick, D. B., & Murphy, R. J. L. (1986). Mastery, validity and comparability issues in relation to graded assessment schemes. Studies in Educational Evaluation, 12, 305-311.

Perkins, J. A. (1985). International council for educational development (ICED). In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2657-2659). New York: Pergamon Press.

Pizarro Sanchez, R. (1992, April). Quality of instruction, home environment and cognitive achievement. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Porras-Zuniga, J. (1985). Comparative statistics in education. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 874-882. New York: Pergamon Press.

Postlethwaite, T. N. (1985). International association for the evaluation of educational achievement (IEA). In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2645-2646). New York: Pergamon Press.

Reed, F. (1983, April). The administration of mastery learning: The Lebanon model. Paper presented at the annual meeting of the American Educational Research Association, Montreal.

Reezigt, G. J., & Weide, M. G. (1990, April). The effects of group-based mastery learning on language and arithmetic achievement and attitudes in primary education in the Netherlands. Paper presented at the annual meeting of the American Educational Research Association, Boston. (ERIC Document Reproduction Service No. ED 317 584)

Reves, T., & Levine, A. (1990, April). From needs analysis to criterion-referenced testing. Paper presented at the World Congress of Applied Linguistics sponsored by the International Association of Applied Linguistics, Thessaloniki, Greece. (ERIC Document Reproduction Service No. ED 324 926)

Rogoff, B., & Morelli, G. (1989). Perspectives on children's development from cultural psychology. American Psychologist, 44, 343-348.

Rosier, M. J. (1985). Comparative studies: Attitudes to schooling. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 2) (pp. 882-884). New York: Pergamon Press.

Russell, R. W. (1984). Psychology in its world context. American Psychologist, 39, 1017-102

Sandrin, J. V. (1990). Readiness for individualization and mastery learning: An assessment of educational beliefs among three groups of educators. Germany: Department of Defense Dependents Schools (DODDS) Germany Region. (ERIC Document Reproduction Service No. ED 317 505)

Sexton, V. S., & Misiak, H. (1984). American psychologists and psychology abroad. American Psychologist, 39, 1026-1031.

Shade, B. J. R. (Ed.). (1989). Culture, style and the educative process. Springfield, IL: Charles C. Thomas Publisher.

Sherman, J. G. (Ed.). (1974). PSI personalized system of instruction: 41 germinal papers. Menlo Park, CA: W. A. Benjamin, Inc.

Shweder, R. A., & Sullivan, M. A. (1993). Cultural psychology: Who needs it? In L. W. Porter & M. R. Rosenzweig (Eds.), Annual review of psychology (Vol. 44) (pp. 497-523). Palo Alto, CA: Annual Reviews, Inc.

Skaalvik, E. M. (1975). An evaluation of mastery learning. Scandinavian Journal of Educational Research, 19(2), 59-74.

Smith, R. J. (1983). On Ardila's international psychology. American Psychologist, 38, 122-123.

Stanford, J. D., & Imrie, B. W. (1981). Evaluation of a third year distance education course: Monetary economics (Working Papers in Distance Education, No. 1). St. Lucia, Australia: Queensland University, School of External Studies and Continuing Education. (ERIC Document Reproduction Service No. ED 328 235)

Stone, F. D. (1985). International educational administration. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2667-2669). new York: Pergamon Press.

Straker, N. (1988). Interactive video: A cost-effective model for mathematics and science classrooms. British Journal of Educational Technology, 19(3), 202-210.

Studman, C. J. (1984). A method of applying mastery learning to moderately large classes. Int. J. Math. Educ. Sci. Technol., 15(1), 95-100.

Sutton, F. X. (1985). International cooperation and assistance in education. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2651-2655). New York: Pergamon Press.

Tenenbaum, G. (1986). The effect of quality of instruction on higher and lower mental processes and on the prediction of summative achievement. Journal of Educational Research, 80(2), 105-114.

Tharp, R. G. (1989). Psychocultural variables and constants: Effects on teaching and learning in schools. American Psychologist, 44, 349-359.

Thomas, R. M. (1985). Individualized instruction. In T. Husen & T. N. Postlethwaite (Eds.), The international encyclopedia of education: Research and studies (Vol. 5) (pp. 2446-2451). New York: Pergamon Press.

van der Linden, W. J. (1987). Applications of decision theory to test-based decision making (Project Psychometric Aspects of Item Banking No. 23; Research Report 87-9). Enschede, The Netherlands: Twente University, Department of Education. (ERIC Document Reproduction Service No. ED 309 189)

Vos, H. J. (1988). Simultaneous optimization of decisions using a linear utility function (Research Report 88-15). Enschede, Netherlands: Twente University, Department of Education. (ERIC Document Reproduction Service No. ED 310 127)

Wahby, E. I. E. (1979). Diagnosis and mastery treatment in mathematics: A strategy for remedial teaching in the upper forms of Egyptian primary schools. Unpublished doctoral dissertation, Wales, Cardiff.

Ward, G. (1979). Learning time and teaching for mastery (Occasional Paper No. 15). Victoria, Australia: Australian Council for Educational Research. (ERIC Document Reproduction Service No. 183 596)

Warries, E. (1974, April). Standard mastery curves and skew curves. Paper presented at the annual meeting of the American Educational Research Association, Chicago. (ERIC Document Reproduction Service No. ED 091 422)

Washburne, C. W. (1922). Educational measurements as a key to individualizing instruction and promotions. Journal of Educational Research, 5, 195-206.

Whiting, J. (1982). Cognitive assessment and student attitude. Assessment and Evaluation in Higher Education, 7(1), 54-73.

Whiting, J. (1984). Cognitive and student assessments of a CAL package designed for mastery learning. Comput. Educ., 8(1), 59-67.

Zhongliang, F., Xuyang, Z., & Xiaoping, W. (1984). Experimental research on controlled mastery of concepts. Acta-Psychologica-Sinica, 16(2), 147-154.